CSCAPE 2005: NOAA Ship David Starr Jordan
Weekly Science Report – Leg 7
23 November 2005
Jessica Redfern, Cruise Leader

Science Summary: 18 November – 23 November, 2005

It's the last leg of CSCAPE and the David Starr Jordan is heading home. We left San Francisco at 11:30am on November 18th under beautiful, sunny skies. Short sleeves were actually seen on the flying bridge – quite a change from the storms of last leg! We welcomed aboard two new scientists. Shannon Lyday, from the Gulf of the Farallones National Marine Sanctuary, and Beth Phillips, who just graduated with a Master's from Moss Landing, are both working as independent observers. We'll use the data they collect to help estimate the number of animals that were not detected by the observers. With this team, it won't be many!

The good weather has meant that we've had more consecutive days of effort than the observing team has seen in quite some time. It's been a pleasure to watch them work; the routine is well honed. For example, when we have humpbacks, you can always find cameras trained on the animal and hear the click, click, click of multiple shutters that signal when the animal flukes. When we have common dolphins on the bow, and there have been a lot this week, the biopsy team is there, bringing in the samples.

We were also quite excited one morning when the biopsy team was able to bring in samples from every individual in a group of humpback whales. They worked in conjunction with our photographers so that we'll have biopsy samples matched to fluke and dorsal fin photographs. Of course, it wouldn't have been possible without the officers and members of deck department who coordinated the small boat launch and our driver extraordinaire, Chico.

It's also amazing to watch the birders following animals in flight and identifying the species from what seems like an incredible distance. Their dedication is amazing; even this late in the cruise, it's sometimes difficult to convince them to end effort in the evening. Their help in tracking cetaceans is also much appreciated.

We've got the acoustic team too! On sightings of single species schools, you'll find them listening with their head phones and taking notes in their logbook. They successfully launched a sonobuoy this week and got some interesting recordings.

Finally, we've got our two oceanographers collecting the data necessary to understand the California ecosystem. This team has their work cut out for them this leg. We'll be doing a number of transits at night to pick up all of our tracklines, which means that they'll be doing extra CTDs. The positive, enthusiastic answers that greet these requests for extra CTDs are fantastic, particularly this late into the cruise.

There is a lot to report from the individual groups this week. Risso's dolphins, Dall's porpoise, common dolphins, fin whales, minke whales, and humpbacks have kept everyone busy. Keep reading!

Sightings and Effort Summary for Marine Mammals

Date	Start Stop	Position	Total Distance	Avg. Beaufort
111805	1439	N37:42.35 W122:49.42	6.5 nmi	3
	1519	N37:39.98 W122:57.13		
111905	741	N37:24.75 W123:55.52	52.6 nmi	3.5
	1704	N37:40.56 W125:12.94		
112005	710	N37:40.11 W125:16.89	83.8 nmi	4.3
	1700	N38:02.58 W127:02.56		
112105	712	N36:16.53 W125:57.37	78.9 nmi	3.8
	1704	N35:55.36 W124:13.70		
112205	703	N35:54.54 W124:10.17	56.9 nmi	2.7
	1654	N35:36.82 W122:40.98		
112305	659	N35:35.13 W121:19.66	75.5 nmi	4.2
	1650	N34:18.59 W121:43.46		

CODE	SPECIES	TOT #
17	Delphinus delphis	10
21	Grampus griseus	2
22	Lagenorhynchus obliquidens	3
27	Lissodelphis borealis	3
44	Phocoenoides dalli	10
49	ziphiid whale	1
61	Ziphius cavirostris	2
70	Balaenoptera sp.	2
71	Balaenoptera acutorostrata	1
74	Balaenoptera physalus	4
76	Megaptera novaeangliae	8
77	unid. Dolphin	3
79	unid. large whale	2
	TOTAL	51

Biopsies (Gary Friedrichsen, Laura Morse, Kathy Hough, and Rich Pagen)

Species	18 - 23 Nov	CSCAPE cumulative
Minke whale		1
Humpback whale	6	27
Blue whale		8
Fin whale		2
Sperm whale		11
Baird's beaked whale		2
Short-beaked common dolphin	21	157
Pacific white-sided dolphin		25
Northern right whale dolphin	4	14
Striped dolphin		2
Dall's porpoise		16
Killer whale		5
Risso's dolphin		4
All species	31	274

"Frozen Zoo" Project/Cell-culture Report (Laura Morse)

Species	18 - 23 Nov	CSCAPE cumulative
Blue whale		1
Baird's beaked whale		1
Pacific white-sided dolphin		1
Striped dolphin		1
Dall's porpoise		1
Northern right whale dolphin	1	1
Humpback whale	1	1
All Species	2	7

Photo-Project (Cornelia Oedekoven, Holly Fearnbach, and Kathy Hough)

Summary:
Humpback whales: 10 IDs
Minke whale: 1
Risso's dolphins: 1 school
Short-beaked common dolphins: 6 schools
Northern right-whale dolphins: 2 schools

This week was rather exciting. First of all, we have pictures of cetaceans from each of the six days included in this report. I do not remember the last time this happened – probably somewhere around leg 2. This is a result of the overall good weather ranging between Beaufort 2 and 5 and the fact that we had some really cool sightings. It started out with a nice bunch of Risso's dolphins the day we left port. Set against the lovely scenery of the Farallon Islands in

the light of the sinking sun, the dolphins stayed in a nicely packed school as we approached them with the small boat.

Nicely packed cluster of Risso's dolphins sighted within 3 nautical miles off Southeast Farallon Island (photo: Cornelia Oedekoven).

The next morning a minke whale tried to sneak by the ship unnoticed leaving only a footprint within 150 m on our port side as a first cue of its presence. As we turned the ship to follow its path, we were able to observe and take pictures during a few surfacings as the whale continued on its steady way. During the course of the week we collected a total of ten humpback whale IDs, the last five of them in a combined between the flying bridge and small boat (yes, finally we got salty again!) operations in the early morning light off Point Conception. Short-beaked common dolphins were plentiful again this week. But the highlights were two schools of northern right-whale dolphins that we encountered on 22 November. After not seeing this species for a long time, we must have found the spot where they really like to hang out.

Part of a large school of northern right-whale dolphins leaping alongside the ship (photo: Cornelia Oedekoven).

Both sightings were in the three digit numbers and spread out over some five nautical miles separated in distinct clusters. The second sighting started out like the first one, with small

clusters detected from about one nm out to almost the horizon. But then we found the very large group: a cluster consisting of a few hundred dolphins all running hard providing us with some spectacular sights of these animals.

Seabird report (Rich Pagen and Thomas Staudt)

It would seem that as the David Starr Jordan steamed beneath the Golden Gate Bridge last week, it was mysteriously transported through time and space, materializing on a sea that none of us CSCAPE scientists had ever set eyes on before (except perhaps behind shut eyes late at night in our bunks). Cashing in some of our "weather and sea state" karma" perhaps? Hard to say. But we do know that it was perhaps the most wonderful weather week in recent memory.

Thirty-two bird species were recorded this week. As always, the distinction between surveying on the shelf and offshore was a very clear one. And this week, our voyage gave us ample time to taste both situations. On the shelf, our heart rates (and probably blood pressure too) climbed as bird after bird flashed in front of our eyes, while our fingers performed a frenzied dance on the data computer keyboard, frantically trying to keep up with all that our eyes were seeing: Western, California, Herring, Heermann's and the occasional Bonaparte's Gulls, along with Brown Pelicans, and Brandt's and Double-crested Cormorants. Further out, Sooty, Pink-footed, Buller's and the occasional Flesh-footed and Short-tailed Shearwaters began to replace the ubiquitous gulls. And finally, in offshore waters (the area where we spent the majority of our time this week), the bird community shifted once again, and with it came an overall decrease in relative abundance. Small numbers of Cassin's Auklets, Leach's Storm-Petrels, and Northern Fulmars became our constant companions, with a few Pterodroma petrels mixed in (2 Cook's, and single Mottled and Murphy's Petrels) to keep us on our toes. Both the Mottled Petrel and the Murphy's Petrel were within California waters, the Murphy's Petrel being particularly interesting because of the late date (sightings are usually in the spring and early summer). We did, however, observe a total of 13 Murphy's Petrels in Oregon waters three weeks ago, so the presence of another individual in California waters was not completely unexpected.

Other interesting observations this week included Red-throated Loon, Xantus' and Ancient Murrelet, increasing numbers of Black-legged Kitiwakes, and three South Polar Skuas on the 19th which, if they have any intention to breed this year, had better pick up their calendar and open to the second to last page – the Antarctic summer has nearly begun and they have a long way to go.

Oceanographic Operations (Candice Hall & Liz Zele)

We're now below the Point Conception junction between the California and Davidson currents and are definitely enjoying the smoother weather. The last few days have been very exciting as we moved onto the coastal shelf. The inshore water temperature has increased slightly (from 13°C to 15.5°C – that is 55.4°F to 60°F) from the offshore waters and our bongo samples have definitely increased in abundance and diversity.

Last night we discovered a perfect *Carinaria cristata*, with its visceral shell intact. While waiting for its turn under the microscope, it had a great time munching on a chateognath that it

'caught' in our Petri dish, our own live nature show! The same trawl revealed what could possibly be a *Cestum veneris*, which is Greek and Latin for Venus' Girdle. Although transparent overall, the meridional canals were reddish/violet in color. As they are known to have very delicate tissues, we decided against any attempt to manhandle it for a closer study, we figured the net would have done enough damage. A few nights previously we found a fantastic *Phronima sp*. specimen (sea flea), which wasn't very cooperative when we tried to photograph him, hence Figure 1 below was probably take 20! I guess we should have paid his agent a higher commission.

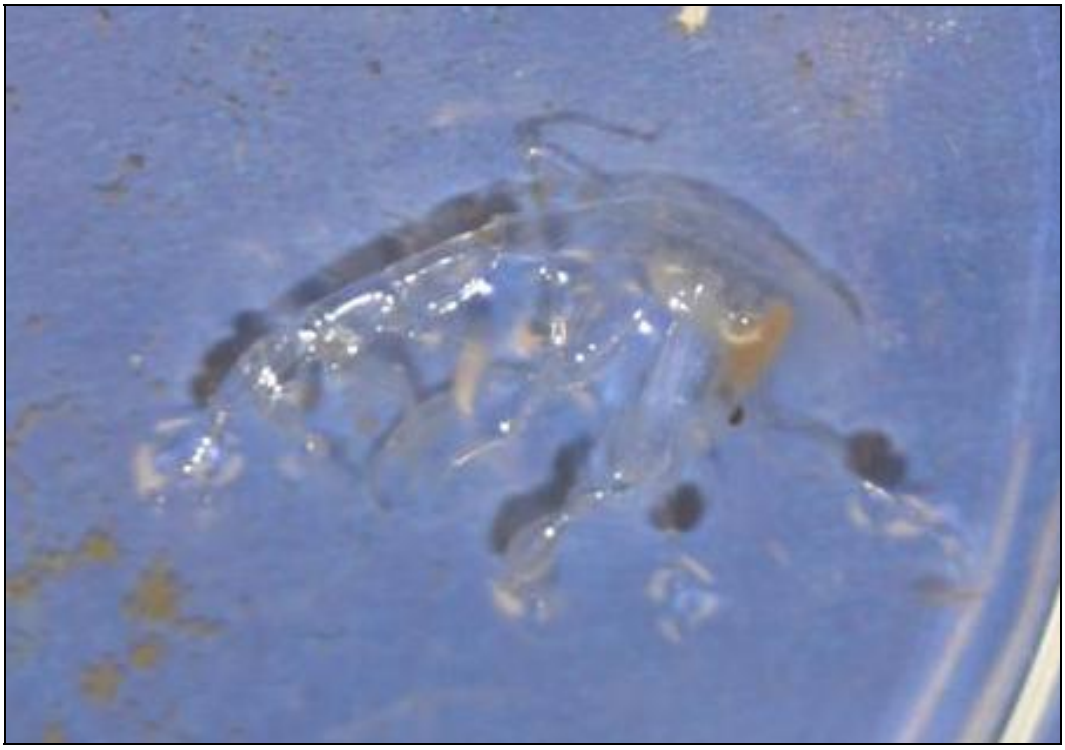

Figure 1: *Phronima sp.* (Photo: Jessica Redfern).

As Cornelia mentioned, we had two magnificent sightings over the last two days, northern right whale dolphins and humpback whales. NOAA National Centers for Coastal Ocean Science (NCCOS)'s Biogeographic Assessment (2003) shows that northern right whale dolphins were generally found within the continental shelf and slope areas (Figure 2a), which is where we found them this week. Evidently they respond to changing oceanographic seasons and may be found in these waters during the Davidson Current season, which is generally from November to March each year. One of their preferred prey species is squid, a school of which accompanied our CTD last night. A few fishers tried their luck but alas we'll not be having calamari this Thanksgiving.

The NCCOS study (2003) found that humpback whales were mainly situated over the shelf and continental slope, even during the Davidson Current season which was when they recorded the lowest Humpback densities (Figure 2b). NOAA/SWFSC stock assessment sightings maps show humpback whales occurred off northern and southern California during 1993, 1996, and 2001, again along the continental shelf and slope (NCCOS, 2003). Humpbacks prefer, amongst other delicacies, seasonal pelagic schooling fish, such as the large school of lancet fish that surrounded

our CTD upon retrieval yesterday morning. Not long afterwards we were privileged to be audience to a happy humpback off our stern, who breeched no less than eight times in a row! In 300m of water, the humpback was conforming to previous continental shelf preferences.

Figure 2 depicts the density of northern right whale dolphins and humpback whales in the Upwelling, Oceanic, and Davidson Current seasons. Surveyed cells with no target animals have a density of zero, while non-surveyed areas were left white. Light blue lines show the 200m and 2000m bathymetric contours (NCCOS 2003), showing that 'our' animals like the shelf and slope, again confirming previous research on their distribution.

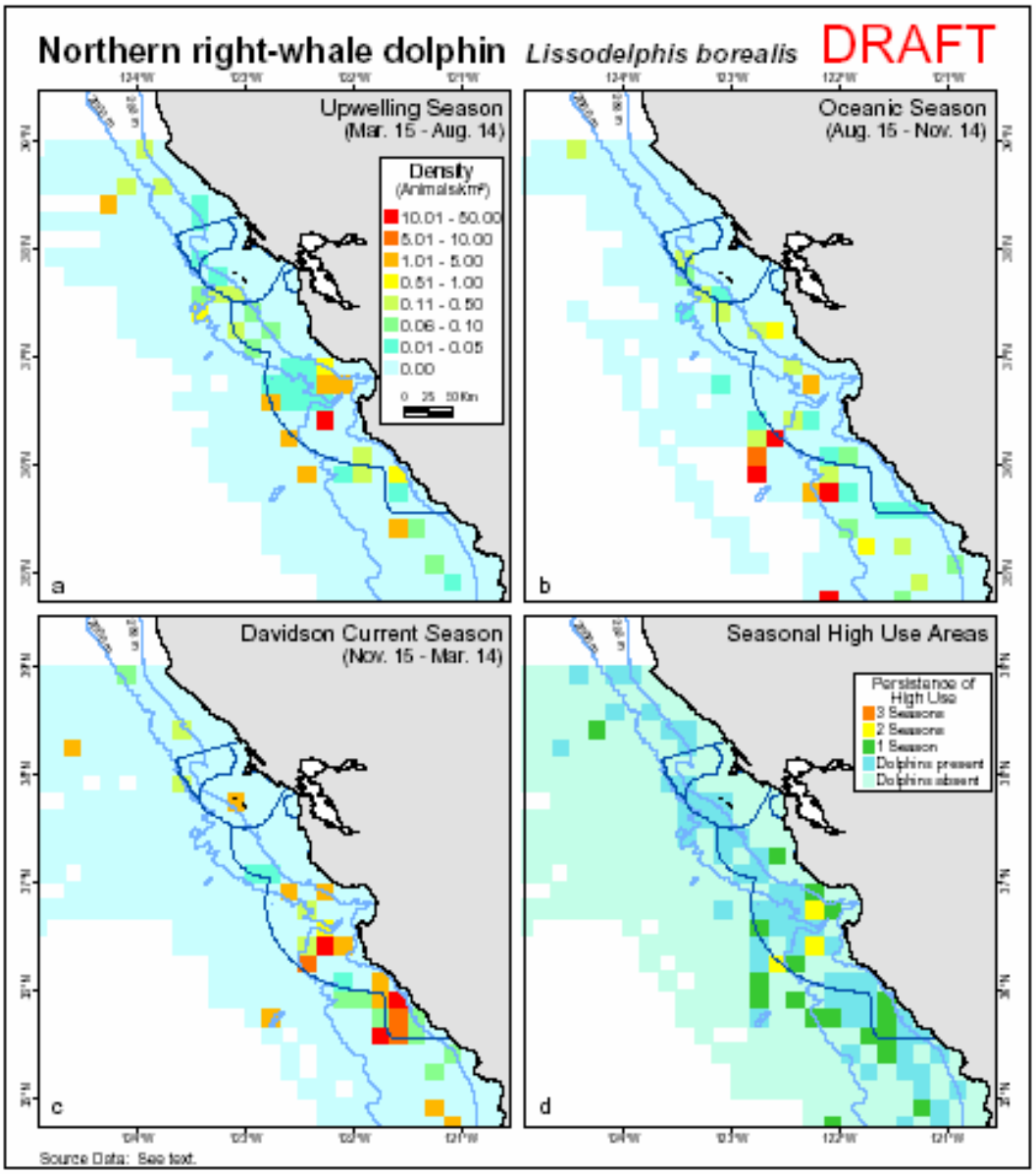

Figure 2a: Density and seasonal distribution of northern right whale dolphins (NCCOS, 2003).

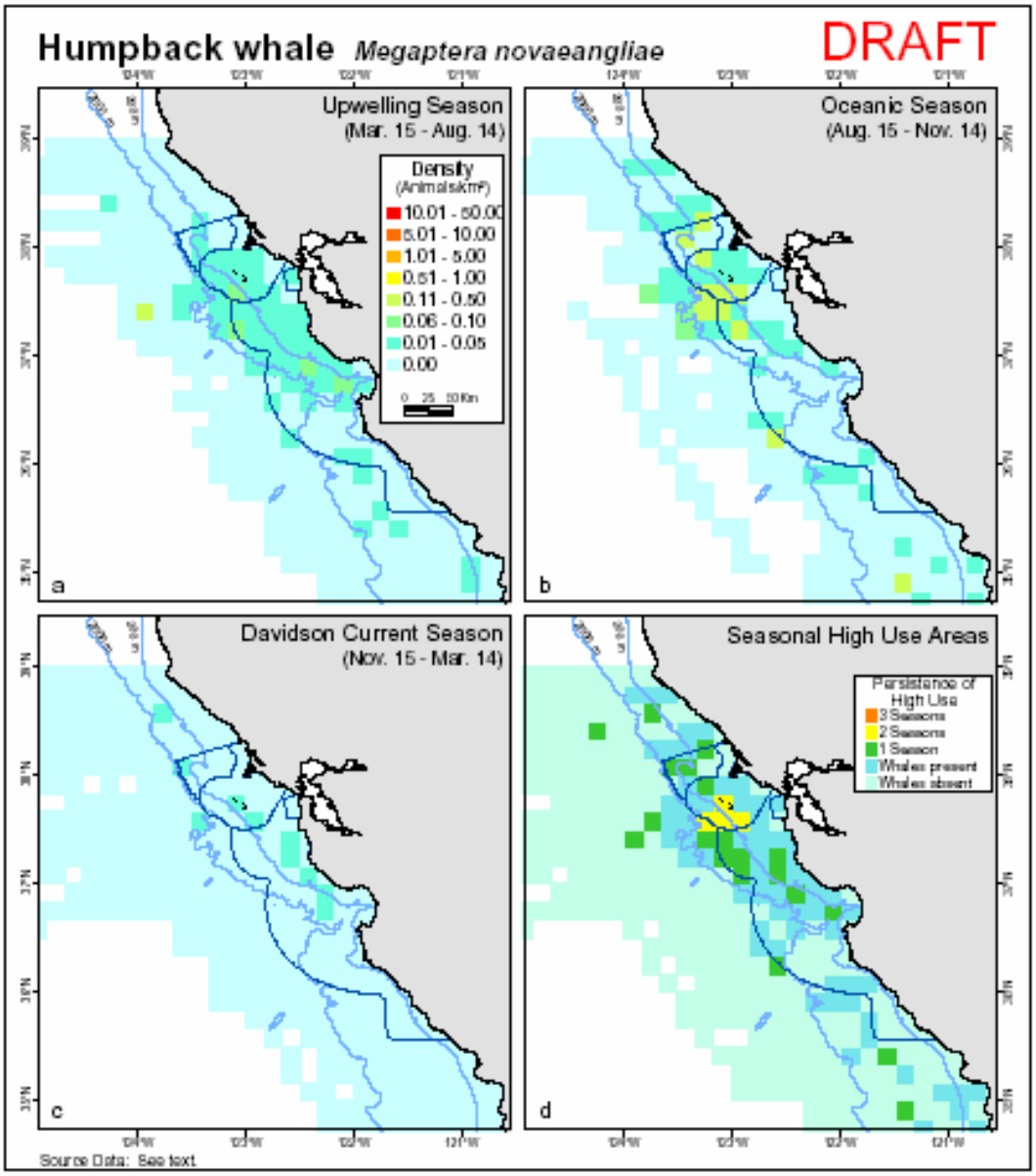

Figure 2b: Density and seasonal distribution of humpback whales (NCCOS, 2003).

Date	CTDs	XBTs	Bongo Tows	Comments
11/17	In Port – San Francisco			
11/18	0	0	1	
11/19	0	3	1	Engine problems reduced operations
11/20	2	3	1	
11/21	0	4	1	Time limitations
11/22	2	3	1	
11/23	2	3	1	

NOAA National Centers for Coastal Ocean Science (NCCOS) 2003. A Biogeographic Assessment off North/Central California: To Support the Joint Management Plan Review for Cordell Bank, Gulf of the Farallones, and

Monterey Bay National Marine Sanctuaries: Phase I - Marine Fishes, Birds and Mammals. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD 145 pp.

Squeakly Report (Liz Zele and Laura Morse)

Dolphins, dolphins, dolphins! Our week long progression on leg 7 has led to the recording of multiple groups of smaller cetaceans, particularly common dolphins. Though most species have been willing participants, our encounter with a group comprising almost entirely northern right whale dolphins, unfortunately, decided to refrain from vocalizing. The most exciting event took place our second day out at sea while in the presence of a minke whale. After the launch of a successful sonobuoy and half an hour of restless shrimp chatter, we picked up a unique vocalization between 600-800 Hz. At first, these vocalizations included only upsweeps; however, as time progressed, they alternated with tonal calls of the same frequency. While Laura and I are unsure what created these unique calls (which will be left to the experts), we can verify it is very distinct from the "boing" vocalization recorded in the presence of minke whales on previous cruises. Once again, acoustics has been graced with the presence of mysterious calls!